Intercat aggression – general considerations, prevention and treatment

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Summary
Although cats are a social species and capable of living together in groups of several cats, intercat aggression is a common behavioral problem. Intercat aggression can be classified as status-related, fear-related, play-related, redirected and can also be due to the addition of a new cat to an existing group. Socialization of kittens, choice of the right cat for a multicat household, and the gradual introduction of a new cat to the household can help to prevent intercat aggression. Treatment of intercat aggression should combine behavior modification, management and – if necessary – medication.

Introduction
In Germany, the cat is the most popular pet, with 8.2 million cats living in 16.5% of households (24). Cats are also very popular in the United States, with 32.4% of all households owning cats in 2006 (3). Approximately half of all cat households have two or more cats.

Intercat aggression is the most common feline aggression problem in multicat households. Borchelt and Voith (6; cited after 27) found that 44.3% of multicat homes (n = 544) reported fighting among their household cats occurring at least once a month. Similar results were found by Levine et al. (27). They followed adoption of shelter cats to households with at least one resident cat. Fighting, which was defined as scratching and biting, occurred in 50% of all cases. As more subtle aggressive behavior, such as chasing and hissing, was not recorded, the overall incidence of aggression was probably even higher.

Intercat aggression is also a frequent complaint to the veterinary behavior specialist. At the Behavior Service of the College of Veterinary Medicine, University of Georgia, United States, (UGA Behavior Service) out of 26 feline cases1 presented between August 2006 and July 2009 for behavioral reasons, 11 (42%) were intercat aggression. Similar numbers were found at the Behavior Clinic of the Barcelona School of Veterinary Medicine, with 33% of all cats presented between 1998 and 2006 being seen for aggression directed at other cats (1). The prevalence of intercat aggression in the feline cases presented to the Animal Behavior Clinic at Cornell University between 1999 and 2001 was 13.5% (27). These numbers point out that intercat aggression is a frequent behavior problem.

The aim of this paper is to summarize information about intercat aggression relevant to the general small animal practitioner. First, the social behavior of cats relevant to the problem of intercat aggression and different categories of intercat aggression are addressed. Then, prevention of intercat aggression and treatment of intercat aggression, as currently performed at the Behavior Service of the College of Veterinary Medicine, University of Georgia, United States, are described.

1 Multiple cats of one owner presented for intercat aggression were counted as one case.
The social behavior of domestic cats

“The solitary cat” is a common misconception (11). Cats’ social structures depend upon the availability of food: if food is widely dispersed, cats can survive in a solitary state. However, if food is readily available, cats form social groups, so called colonies (e. g. 5, 20, 32–34, 37, 40). The core of these groups is formed by queens and their offspring, which engage in a variety of social behaviors, including taking care of their kittens together (14). Affiliative behaviors are often observed in colonies of cats and include approaching another cat with the tail up (Fig. 1) or nose touching – both interpreted as friendly greeting behavior, allogrooming of the head and neck area and allorubbing of the perioral area, the lateral aspect of their bodies and the tails, which may have the function of exchanging odor to create a “colony odor” (9, 12, 13).

In an established group of cats, members use a variety of ritualized signals to communicate with each other. A cat that demands access to a resource over another cat will approach her with stiffened limbs, stiffened ears, which are upright and rotated so that the aperture opens laterally, and elevated base of the tail while the remainder of the tail is drooped. Additionally, she will stare at the other cat, sometimes with her head wagging slowly from side to side. The other cat may give way by looking away, lowering the ears slightly, turning the head or leaning backwards (Fig. 2). More extreme forms of submissive behavior are intense flattening of the ears against the head, lowering and curling the tail lateral to the thigh, turning the head to the side, crouching or, most extreme, rolling over (7, 11). These ritualized signals are exhibited based on previous experiences regarding the outcome of conflicts over resources. A number of studies used these signals to determine rank order or hierarchy among group members (e. g. 25, 38). Although the directions of the signalling (assertive vs. submissive) between two individuals is usually the same for one resource, e. g. food, the same hierarchy does not necessarily apply to other resources, e. g. to females in oestrus (25).

Cats of one colony usually do not permit other adult cats to join the group, and aggression is exhibited by most or all colony members towards unfamiliar cats, which are not members of the colony (28). However, if non-colony members are persistent in their attempts to join, they may eventually be integrated into the group by a gradual process that requires several weeks (31, 38).

Classification of intercat aggression

Intercat aggression can be classified as status- or conflict-related, fear-related, play-related, redirected and can also be due to the addition of a new cat to an existing group (12). Overall (35) mentions aggression as a result of lack of socialization as another important category.

In practice, in most cases more than one diagnosis is likely to fit. For example, a cat that experienced a lack of socialization will likely act aggressively towards another cat due to fear. Fear-related aggression can be diagnosed by observing the cat’s body language. A fear-aggressive cat arches her back, pulls her ears back, arches the tail or puts it up in the air, shows her teeth and growls or hisses, usually with piloerection on the back and the tail (Fig. 3).

A lack of socialization can also contribute to the development of status-related aggression. In a functioning multicat household with sufficient resources (such as food bowls, litter boxes, toys, beddings, water bowls), fights over resources should not be common; instead, cats should use their species-specific signalling to avoid conflicts about the resources. However, sometimes one cat aggressively guards resources and does not allow other household cats to have access to them. Crowell-Davis et al. (14) describe these cats as “bully cats”, cats that show a high amount of aggressive behavior around resources, even if they are available in a sufficient amount. Often these cats have a history of poor socialization with other cats and therefore lack species typical subtle communication skills.
Predatory behavior is one important element in the play of cats, and often predatory and play behavior come together. During the socialization period kittens learn how to play appropriately. In particular, hand raised kittens, which do not have the opportunity to learn from their littermates the boundaries of play, may show intense play behavior towards other cats as adults, which can be misinterpreted as aggressive behavior by the other household cat. These cats can pose a problem in multicat households, especially when combined with a fearful cat that responds to rough play or predatory behavior by running away, thereby provoking more predatory behavior.

Redirected aggression, defined as aggression towards an irrelevant or inappropriate, but accessible target, when the primary inciting stimulus is inaccessible, is a common form of aggression in cats (1, 10). Amat et al. (1) studied redirected aggression in cats and found that it was most commonly directed to the owner followed by aggression directed to another cat living in the same household. Often, loud noises or interactions with other cats were found to be the inciting stimuli. Therefore, not surprisingly, cats that performed redirected aggression were more likely to have a sound phobia than cats that did not show this behavior. In most cases the aggressive cat did adopt a defensive body posture immediately before the incident of redirected aggression. Therefore, the underlying motivation in these cases seems to be fear. This emphasizes the importance of proper habituation of the kitten to sounds to avoid redirected aggressive behavior in the adult cat.

Aggression often occurs directly after the addition of a new cat to a household with one or more resident cats. Levine et al. (27) reported that in half of the households where a new cat was introduced, fighting (defined as scratching or biting) occurred. However, in most cases fighting went down in less than 1 month.

Aggression between cats can also occur after one cat has been removed from the household for a few hours, e.g. for a visit to the veterinarian. It is not fully understood why cats react aggressive in this situation but likely fear, possibly triggered by the scent of the veterinary clinic, plays a role.

Any form of discomfort or pain increases irritability and therefore the likelihood of aggressive behavior in a multicat household. Therefore, cats involved in intercat aggression need to be evaluated by a veterinarian. This is especially important, if household cats got along well and, without an apparent trigger, one cat starts expressing aggressive behavior towards the other.

In intercat aggression, the direction of the aggression is usually one way. Lindell et al. (29) found that out of 50 cases of intercat aggression, in 43 cases one aggressor and one victim could be identified. When working with intercat aggression cases, it is always crucial to evaluate all cats involved in the fighting to develop an efficient treatment plan.

Prevention of intercat aggression

Socialization

Social species are born with the capacity to learn species-specific social skills, but the learning itself occurs during the socialization period. Therefore, appropriate experience of a kitten with other kittens and adult cats with their own species during weeks 3–8 is critical for the development of appropriate species-typical social behavior (30, Fig. 4). Pleasant interactions with their own species are also important in the late socialization period from week 9 to 16 to allow the kitten to develop into a social cat that will adjust readily to living in a multicat household (2). Therefore, it is not surprising that cats that are adopted as kittens and subsequently kept in a one-cat household for several months or years miss important learning and social bonding experiences that
happen during late kittenhood and the juvenile period, and the lack of these experiences may affect the likelihood of the cat existing peacefully within a multiscat household (14). As adults, these cats may exhibit fear-aggressive behavior, fail to recognize species-specific signals, fail to respond in a species-appropriate manner or show inappropriate play behavior, which may elicit aggressive behavior in other cats.

Choosing the right cat for a multiscat household

The importance of choosing a well-socialised cat is outlined above. Choosing two cats of the same litter or a mother and her offspring, can be an effective way of preventing intercat aggression. These cats will be able to continue practicing their social skills after being separated from the rest of their family. The results of Bradshaw and Hall (8) and Curtis et al. (17) support this idea. They studied the behavior of cats living in colonies, and found more affiliative behavior between littermates than between non-littermates and between related cats than non related cats.

If a new cat will be added to an existing cat household, the question of gender and age of the new household member arises. Recommendations regarding gender vary as results of studies investigating the relationship between sex and intercat aggression vary. While Lindell et al. (29) found that males were more likely to be the aggressor in intercat fights with an equal possibility of directing the aggression to males or females, Hart and Cooper (22) found that males direct aggression more towards female housemates than male housemates. Therefore, choosing a female cat as the first cat of a household, if further feline additions are planned, might be beneficial in avoiding intercat aggression. In contrast, Barry and Crowell-Davis (4) and Levine et al. (27) found no association between gender and intercat aggression.

Results also vary regarding recommendations for the age of the new cat. While Landsberg et al. (26) and Crowell-Davis (12) recommend adoption of a kitten, Levine et al. (27) found no association between age of adopted cat and the occurrence of aggression. However, most of the animals in their study were juveniles. In rare cases, if the resident household cat shows severe aggression towards overabundant play behaviour of the new housemate, a kitten may be even more at risk than an adult cat. Therefore, careful evaluation of the temperament of the resident cat is important trying to choose the best fitting new household member.

Introduction of a new cat

In the study by Levine et al. (27) half of the owners who obtained a cat from a shelter and already owned one or more cats, put the cats together without a gradual introduction. In this study, no significant difference was found between intercat aggression in households where owners tried to gradually introduce the cats compared to households without gradual introduction. However, methods of gradual introduction were not further evaluated. Therefore it is likely that the concept of gradual introduction varied between owners. Certainly, methods of introducing a cat to a new household need further investigation.

Following is the protocol of gradual introduction currently recommended by the UGA Behavior Service. When a new cat is added to a household with one or more resident cats, the new cat should be separated in the beginning. The easiest way for separation is to set up one room with all necessary resources, such as food, water, a litterbox, elevated hiding places, bedding and toys. Before physical contact between the cats is allowed, smell should have been exchanged. An easy way to do so, is to rub all household cats’ perioral and buccal areas gently with a towel to facilitate odor exchange. The areas of the head, the tail and the flank carry sebaceous glands that play an important role in intercat olfactory communication (39). Multiple towels or other pieces of cloth should be used, with a cloth that has been rubbed on one cat subsequently left being in the area of residence of another cat. Also, items with odor on them such as beddings can be exchanged. An easy way to allow odor exchange is to keep the new cat separated in one room first and then put her in another room that was used by the resident cat and allow the resident cat to explore the room of the new cat.

After a few days, visual and auditory contact should be allowed. This can be done with baby gates (for cats, who would jump one baby gate, higher gates developed for dogs can be used or two baby gates can be arranged on top of each other). Another option is to open the door of the room of the new cat only for a few centimetres and block it from further opening. Behavior of both cats, when interacting with each other, should be closely supervised for signs of aggressive signalling.

If encounters are non-aggressive, cats can be allowed together under supervision. For enhanced control over the situation, it is beneficial to make both cats wear a harness with a leash attached. This way, a fight can be broken up without risking injury to humans and without increasing agitation by shouting or yelling at the fighting cats. Instead, when one cat shows aggressive behaviour, she can be calmly removed from the situation. In this case, owners have to go back to the more gradual introduction or try to desensitize and countercondition the cats to each other’s presence as described below.

It is important that both cats have been accustomed to being harnessed before using harnesses in a situation, where the cats meet each other. This can be accomplished by providing treats while putting the harness on the cat. Feeding her only with the harness on allows a positive association with it. Playing with the cat while she wears a harness allows her to learn that movement is not restricted by it. Once the cat is completely comfortable with the harness, a house leash can be attached.

Treatment of intercat aggression

General treatment considerations

Cats with a history of intercat aggression should be separated at all times when not supervised. When the cats are allowed to interact,
the owner should pay attention to both cats all the time. Short intervals for interaction, during which all the principles described below are applied, are much more beneficial than long intervals that are not appropriately supervised and in the worst case may end with a cat fight. There are several ways of introducing cats (see above gradual introduction and below desensitization and counterconditioning) but some basic principles apply to all of them:

Both cats should be **closely monitored** for signs of aggressive or predatory behavior. It is crucial to catch early signs of assertive aggression, such as stiffening of the legs or staring at the other cat or the first signs of the hunting sequence, such as crouching down and fixating on “the prey” with the tail twitching. These behaviors are usually easy to **interrupt** by startling the cats, e.g. by clapping the hands. The more intense the aggressive or predatory behavior a cat has already shown, the less likely it is that the cat’s behaviour can be interrupted by startling the cat. It is therefore the veterinarian’s responsibility to teach the owner to read the body language of his cats.

Once the aggressive or predatory behavior is interrupted, it is important to **redirect** it to an appropriate outlet. For predatory behavior, this can be a game with the owner and the cat’s favourite toy. A replacement for aggressive behavior can be the fulfilment of a command such as “come”. Obviously, the cat has to be taught to come on command first. This can be achieved by associating the word signal with treats or play.

The general rule in behavior modification “Reward the behavior you want” can also be applied to intercat aggression. Calm behavior around each other should be rewarded in both cats by providing treats, toys or attention. This principle is used when applying desensitization and counterconditioning as described below. Advanced clients can also reinforce non-threatening or even submissive behavior in the aggressor or less fearful behavior in the victim by using a conditioned reinforcer when the desired behaviors occur. Therefore, the cats have to be classically conditioned to a secondary reinforcer, e.g. a clicker (with different sounds for each cat) first.

An approach sometimes found in the literature is, to put a bell on the collar of the aggressor (29). This may help the victim to be aware of the location of the aggressor, so that she can hide if necessary. However, if both cats are supervised all the time when allowed together, using a bell is usually not necessary. To the authors’ knowledge, there are no studies evaluating the efficiency of this method, but it is at least possible that frequent bell ringing causes increased irritability in the aggressor and therefore may even increase the likelihood for aggression. Also, some cats learn how to walk slowly and carefully so that the bell does not ring.

**Desensitization and counterconditioning**

This approach is beneficial for all cats where fear is an underlying motivation for the intercat aggression. Cats should have been separated for a while and exchange of smell as described above should have been performed. The basic principle of **counterconditioning** is that both cats learn to associate the presence of the other one with something pleasant such as food or play. The distance has to be kept large enough that no aggressive and/or fearful signalling occurs. Then, the distance between the cats is gradually decreased. The gradual decrease in distance is **desensitization**.

A baby gate is an effective way to separate the cats in different rooms and still allow visual contact. Alternatively, the cats can be harnessed. If the cats are used to being in a carrier, one or both cats can be placed in separate ones. In practice, most cats have not been trained to associate the carrier with something pleasant and have instead learned that it reliably predicts something unpleasant, such as car rides or visits to the vet clinic. Therefore, carrier training, before using it for the introduction of the two cats, is crucial. Furthermore cats cannot increase distance between each other when placed in carriers, which is certainly disadvantageous for fear-aggressive cats. If using this approach, owners have to carefully monitor their cats’ body language for signs of fear or aggression. Despite these disadvantages, a carrier may be useful to place the aggressor in it, if the underlying motivation for the aggression is status-related or related to predatory behavior, as putting the aggressor in a carrier allows the victim to control the distance between the cats.

It is important that the desensitization and counterconditioning process is begun with a big distance between the cats. One way is to place the food bowls of both cats at a great distance from each other, maybe even in separate rooms in the beginning. If no signs of fear or aggression occur, the distance of the food bowls can be gradually decreased. The speed of decrease in distance has to be adjusted to the cats’ behaviors. If any signs of aggression or fear occur, the distance has to be increased again.

For counterconditioning, a tasty food should be used. Owners should be advised to experiment with different type of cat food to find out which food is preferred by their cats. Often it is necessary to change ad libitum feeding to feeding two or three times a day during the desensitization and counterconditioning sessions. If patients are not food motivated at all, sometimes toys can be used for the counterconditioning process. The owner should use the preferred toy and use it only for the training sessions.

**Punishment**

Positive punishment (adding something unpleasant as a consequence of a certain behavior) can decrease the likelihood of a behavior to occur. However, **three conditions** have to be met for a punishment to be effective:

- The punishment has to be immediate, which means directly following the behaviour.
- It has to be consistent, which means it has to follow each time the behavior occurs.
- It has to be appropriate, which means it should stop the behavior but not harm the animal or make it fearful.

The punishing stimulus has to be unpleasant for the cat. A verbal “punisher” in particular can be perceived as positive reinforcement.

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(attention by the owner), thereby increasing the unwanted behaviour.

In fear-aggressive behaviour, positive punishment is never appropriate as it is likely to increase the underlying motivation for the behavior. Punishment can be beneficial to stop predatory behavior and inappropriate play in cats. It is crucial that the behavior is stopped immediately as it occurs. For example, predatory behavior should be punished when the cat shows the first sequences of the predatory behavior chain, not when she is already chasing the other cat.

From our experience a loud noise such as clapping the hands is often sufficient. Using a water pistol can result in redirecting predatory behavior to the water – then the water becomes a positive reinforcer – but may be sufficient in some animals. If tools such as water pistols are used to stop a behavior, it is crucial that several tools are available throughout the house or the owner is “armed” the whole time to be able to meet the criterion of immediate punishment.

Punishment should never be used as the only training tool. Instead an appropriate behavior must be taught. For example in cases of predatory behavior the behavior should be redirected to an appropriate outlet. Therefore, after having startled the predator her attention should be redirected to a toy.

**Breaking up a cat fight**

Under no circumstances should a cat fight be broken up by the owner using his hands or other body parts, as this poses a serious risk for injury. Certainly, there is no good way to break up a cat fight and the goal has to be to prevent fighting. Fighting is stressful for the cats and the owners and every cat fight should be considered as a major step back in the relationship of the cats involved and therefore in the treatment progress.

If a cat fight occurs and has to be broken up, throwing towels over both cats can facilitate separating them with minimal chance of injury. If both cats are harness trained, it is helpful to make them wear their harnesses with a short, lightweight house leash attached all times, when they are together, to be able to remove them from an aggressive encounter. Obviously, cats have to be supervised all the time when wearing a harness and a house leash, as wearing a harness poses a risk for getting caught somewhere and getting injured. Sometimes it is sufficient to startle the cats, e.g. by using a water pistol or pouring a glass of water over them, then block them from attacking each other by using a physical barrier. However, usually these tools are not available, when a fight occurs. Noises, such as clapping hands or a short shout, sometimes are enough to startle the cats but often only increase arousal and the overall stress level. Constant yelling at the cats certainly is not beneficial in breaking up a cat fight.

It is crucial to educate owners of cats with a history of intercat aggression about body language. Whenever one cat shows signs of aggressive signalling or predatory behavior, the owner has to react immediately to redirect the behavior and avoid a cat fight. If redirecting is not successful, the owner should be instructed to separate the cats and discuss the behavior modification technique with the veterinarian or veterinary behavior specialist, as unsuccessful attempts to “redirect” might lead to an increase in aggression due to accidental reinforcement.

**Medication**

In the United States no drug is approved by the U.S. Food and Drug Administration for a behavior problem in cats. A similar situation occurs in Germany. The veterinary behaviorist therefore has to rely on clinical reports or studies, which evaluate the use of psychoactive drugs for cats. Medication should never be used as the only treatment approach but rather as an addition to management and behavior modification as outlined above. A wide variety of classes of psychoactive medication for cats is used. Only the two most commonly used drugs at the UGA Behavior service are described.

**Buspirone** is a serotonin-1-A-partial-agonist, which also has some dopaminergic effects. Increasing levels of serotonin in the CNS may decrease offensive aggression in cats, much as it does in humans (21). Given in a dose of 0.5–1.0 mg/kg BW every 12 hours, buspirone has anxiolytic effects with no substantial sedative effect (23). Onset of efficacy is not immediate, so medication for 1–4 weeks or longer may be necessary to evaluate the true efficacy of buspirone in a given cat. In general, side effects are uncommon and include sedation and paradoxical increased anxiety. A desirable side effect is that timid cats become “more affectionate”. They will stay near the owner more, rub more on the owner and sit more in the owner’s lab (15). Timid cats can become assertive in their social interactions. Therefore, buspirone has been recommended for the victim of intercat aggression, especially if the cat hides or runs away. However, before prescribing buspirone a careful evaluation of the benefits and disadvantages of one cat becoming more assertive is necessary.

Selective serotonin reuptake inhibitors (SSRIs) have anxiolytic, anticomulsive and some antiaggressive effects (16). **Fluoxetine** is a strong inhibitor of serotonin reuptake and a very weak inhibitor of noradrenaline reuptake. It is often used at the UGA behavior service for the aggressive cat, especially if fear is involved in the motivation of the behavior. The dose range is 0.5–1.5 mg/kg BW once a day. Side effects include sedation, decrease or loss of appetite, gastrointestinal signs, such as diarrhea or obstipation and changes in urinary frequency. SSRIs can take up to 6 weeks until medication shows full effect. The owner needs to be educated about this potential delay in effect. SSRIs can lower the threshold for seizures and therefore have to be used with caution in animals with a history of seizures. In all medications increasing serotonin level, caution has to be used when combined with other medications having the same effect due to possible adverse interactions, called serotonin syndrome. In particular, SSRIs should never be combined with monoamine oxidase-inhibitors and a washout period is needed when switching between the two classes of drugs.

All animals that have been on psychoactive medication, even if the medication is not addictive, should be weaned off the medi-
cation gradually, over several weeks or months, instead of the medication just being abruptly discontinued. In general, a patient can be weaned off after the behavior problem has deceased or is resolved for several months.

Lindell et al. (29) examined the effectiveness of different medication in intercat aggression. The victim cats usually received diazepam to decrease their anxiety in an attempt to suppress their defensive flight response, while the aggressor received a tricyclic antidepressant, buspirone or megestrol acetate. No one treatment resulted in a significantly greater number of cures than any other. However, the use of buspirone for the aggressor cat was associated with significantly more treatment failures.

Administering tablets to a cat can be difficult. Ideally, a cat has been trained to accept the pilling process by using treats instead of tablets, before the daily administration of tablets is necessary. Pill pockets® or wrapping a tablet tightly in attractive food can be a useful tool to make the pilling process more appealing to the cat. Pharmacies can compound psychoactive medication into treats or flavored solutions (e.g. with tuna or chicken flavor), which might facilitate the acceptance. In our experience, most cats accept the administration of psychoactive medication with one of the techniques described.

Feliway® is a synthetic pheromone only available in Europe. It may play a role in allomarking of cats and therefore could help to facilitate introduction of a new cat to the household. Treating both cats with the Feliway® spray may help to reduce aggression and increase acceptance between two unknown cats (reviewed by Pageat and Gaultier, 36).

Enrichment

In all cases of intercat aggression the veterinary behaviorist should check, if the indoor environment provides sufficient resources. This is especially important in a multicat household, when one cat shows status related aggression. Important resources for cats include litter boxes, food bowls, water bowls, elevated hiding places and sleeping areas, and toys. Comprehensive reviews about how to structure the environment of indoor cats are available (18, 19).

Conflict of interest

The authors confirm that they do not have any conflict of interest.

References